Lesson Overview

This overview contains the background information about this lesson, along with the **associated curriculum connections**, skills learned and materials required for students to complete the lesson.

Grade Range:
- 7 – 12

Topics and Themes:
- Natural and Constructed features
- Environment and Community
- Scientific experimentation
- Geographic Inquiry
- Map elements (title, legend, scale)
- Spatial representation (image types, geographic information systems (GIS))

Geographic Scope:
- Local: Your local community

GIS Skills:
- Creating a Web map
- Collecting data using a smartphone
- Selecting and using appropriate basemaps
- Creating map features in ArcGIS Online
- Adding information to map features in ArcGIS Online
- Symbolizing and configuring geographic data in ArcGIS Online
- Searching for content in ArcGIS Online
- Creating queries and expressions in ArcGIS Online
- Measuring absolute distances in ArcGIS Online
- Making a Web application.

Materials Required:
- An ArcGIS Online organization account. If you or your students do not have an account, you can request accounts here: www.esri.ca/agolaccess. Please allow up to two business days for accounts to be created. For more information on ArcGIS Online, visit: www.arcgis.com.
- Access to a mobile device (for collecting data in the field)
- ArcGIS for Desktop 10.x (Optional Extension Exercise only)
- An electronic version of this lesson is available at: http://bit.ly/2ntjmAN

Lesson Contents and Time Required

GIS lessons are assembled for teachers as a collection of resources that are needed to facilitate learning a specific topic or issue using mapping and spatial data. This lesson contains the following resources:

- **Lesson Plan**
  A teacher's resource that outlines the suggested workflow for using the contents of a lesson. This workflow is the same across all of Esri Canada Education's lessons. To download a copy, visit: http://bit.ly/2nsY0Dg
- **Presentation (10 – 15 minutes)**
  A Story Map presentation in ArcGIS Online for the teacher to introduce the GIS skills that will be studied. To view the Story Map, visit: http://arcg.is/2a2CfVt

- **Tutorial(s) (100 – 230 minutes)**
  Hands-on documents referenced in this overview including step-by-step instructions for learning GIS skills.
  - Collector for ArcGIS: 45 – 60 minutes http://bit.ly/2rAXzKt
  - Video: Creating and Saving Features in ArcGIS Online: 5 minutes http://bit.ly/2rjB8ss
  - Introduction to ArcGIS Online: 20 – 30 minutes http://bit.ly/2n1AeMm
  - Using Tables and Filters in ArcGIS Online: 10 – 15 minutes http://bit.ly/2nw1DqD
  - Measuring Features in ArcGIS Online: 20 – 30 minutes http://bit.ly/2o815KJ
  - Symbology (Extension Exercise only): 20 – 30 minutes http://bit.ly/2r7AYns
  - Geoprocessing (Extension Exercise only): 60 minutes http://bit.ly/2rjySkW
- **Assignment (60 minutes)**
  A student activity intended to be the final part of a lesson. Students can complete the tasks by applying the GIS skills learned through tutorials that are relevant to the lesson outcomes.
- **Data**
  Data for the assignment is collected by the individual student in the field using their smartphone. Data for the tutorials are included when the tutorial is downloaded, where applicable.

Note: For a complete learning experience, it is highly recommended that students complete the tutorials associated with this lesson. However, if the tutorials have already been taught, students can use them as a point of reference to complete the assignment.

Learning Outcomes

By completing this lesson, students will gain the following curriculum-focused knowledge:

1. **Identify an environmental issue within their community**
   (**Manitoba** - Grade 7-10 Social Studies, Grade 12 Geography; **Ontario** - Grade 7-12 Geography; **Newfoundland and Labrador** - Grade 8 Social Studies, Grade 12 Geography; **New Brunswick** – Grade 8 Social Studies, Grade 12 Geography; **Saskatchewan** - Grade 8 Social Studies, Grade 10 Social Studies; **British Columbia** - Grade 11 Social Studies, Grade 12 Geography; **Yukon**- Grade 11 Social Studies, Grade 12 Geography; **Quebec**- Secondary, Cycle 1 Geography)

2. **Identify natural and constructed features in their community**
   (**Manitoba** - Grades 9 -10 Social Studies, Geography Grade 12; **New Brunswick** - Grade 8-9 Social Studies; **Prince Edward Island** - Grade 8-9 Social Studies; **Nova Scotia** - Grade 8-9 Social Studies; **Newfoundland and Labrador -** Grade 8-9 Social Studies; **Alberta** - Grade 9 Social Studies; **Ontario** - Grade 7 -8 Geography, Grade 9-12 Geography; **Northwest Territories** - Grade 9 Social Studies; **Saskatchewan** - Grade 7-9 Social Studies; **Quebec**- Secondary, Cycle 1 Geography)

3. **Complete the five steps of the Inquiry Process**
   (**Manitoba** - Grade 9 Social Studies; **Ontario** - Grade 7-12 Geography; **Prince Edward Island** – Grade 10 Geography: **British Columbia** - Grade 7 -10 Social Studies; **Yukon** - Grade 7 -10 Social Studies)

Background Sources Used

In the assignment, students will follow the geographic inquiry process to study features that are of interest to them in their community. Students will use GIS tools available in ArcGIS Online to explore, analyze and act on their results.

Geographic Inquiry Process

The Geographic Inquiry Process is a five-step process that walks students through studying a problem by answering one or a linked series of spatial questions. Students first think of and state their spatial question(s), find or collect the data needed to answer the question(s), explore the data they collected by creating maps, charts or graphs, create queries to analyze the
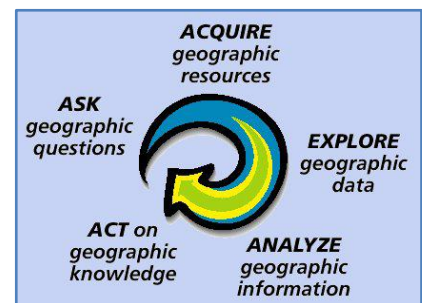
data and draw conclusions, and finally act on their conclusion(s) by making recommendations to their community.

http://www.esri.com/industries/k-12/education/~/media/Files/Pdfs/industries/k-12/pdfs/geoginquiry.pdf

ArcGIS Online

ArcGIS Online is a Web-based software tool that allows a user to create interactive maps and applications (apps), and, if desired, to share them with the world across the Internet. ArcGIS Online also gives users access to data, maps and apps already created by other users within the worldwide community of GIS.

http://resources.arcgis.com/en/help/getting-started/articles/026n00000014000000.htm

Esri's Collector for ArcGIS Application

Esri's Collector for ArcGIS application (app) allows you to use your smartphone to collect and update information in the field, log your current location, and use the data you capture to make informed and timely decisions. The Collector for ArcGIS app lets you add your data to a Web map. This information is saved in your ArcGIS Online Organization account so it is accessible once you log in to this. This app is available for iPhone and Android devices.

http://resources.arcgis.com/en/collector/

Accuracy

The spatial accuracy of point locations collected from a smartphone or handheld GPS receiver will depend on the device, the weather at the time data are collected, the visibility of the device to the sky (density of tree canopy and cover or indoor locations), and how the device is held (above a person's head or close to their body). For optimal results, you should be away from overhanging objects or buildings and hold the device so it has a clear view of the sky.

http://bit.ly/WQoR5w